ROTUNDA

WINTER 1976 VOLUME 9 NUMBER 4 $1.25

Omens of Disaster

Loch Ness Revisited

A Pharaoh's Temple to the Sun

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ROTUNDA

the magazine of The Royal Ontario Museum

Volume 9, Number 4, Winter 1976

Focus *Chris McGowan* 2

Stalking the Brown Flower Bat *David Nagorsen* 4
The Strange Mammals of the West Indies

Omens of Disaster *Henry C. King* 12
When Heaven Blazed Forth the Death of Princes

Prehistoric Man in Ontario *Peter Storck* 20
A New Gallery for the Museum

The Growing Collections 26

Recent Publications 31

A Pharaoh's Temple to the Sun *Allyn Kelley* 32
Archaeologists Unearth the Remains of the Cult that Failed

Index 1976 40

The Crab Nebula, the remnant of an awesome star explosion that was seen from earth in 1054 A.D. For mankind's view of other celestial phenomena, see page 12. (Photo by Mount Wilson and Palomar Observatories)

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Published quarterly by the Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, M5S 2C6. Subscription $4.00 a year. Single copies $1.25 each, back issues $1.50.

Second class mail registration number 1531

Loch Ness Revisited

Chris McGowan

The Museum can be a lonely place during the summer months. Most curators either are away in the field or are on vacation, and the return at the end of the summer is reminiscent of the start of a new school term. There is so much news to catch up on. I was more reluctant than usual to recount my exploits of the summer, and for good reason. When you have spent the summer at Loch Ness few people are satisfied with a few perfunctory remarks; nothing less than a complete account of the entire expedition will satisfy.

I arrived in Scotland in the early hours of the morning of May 31, feeling fairly confident that there were large aquatic animals in Loch Ness. While I had no expectation of seeing any animals myself, and only a slightly higher hope of obtaining concrete evidence, I felt fairly certain that the summer would decide me completely, one way or the other. Long before my departure from Scotland in mid-July I was completely decided.

My role in the expedition, sponsored jointly by the Academy of Applied Science and the *New York Times*, was to conduct a sonar survey of the bottom of the loch. The rationale for this operation was simple: if there are living animals in the loch, there should be dead ones on the bottom, and the intention was to look for remains and attempt a recovery. Certain basic assumptions were made: that there are animals in the loch, that they have a skeleton which is bony and therefore likely to be preserved, and that the sonar equipment is capable of detecting skeletons. The last assumption was tested experimentally beforehand, and found to be true, but the other assumptions were obviously untestable. The sonar search for skeletal remains was one part of the expedition; an underwater surveillance for evidence of living animals was the other. The photographic equipment which had been used with success in previous years (see Rotunda, Summer 1976) was employed, with improvements, and with the addition of an underwater TV camera. Later on in the expedition a stationary sonar transducer was set up in Urquhart Bay, just off Temple Pier, to monitor water movements in the vicinity of the camera equipment.

As in most other field operations there were numerous problems, most of which were unavoidable. There were delays in getting some pieces of equipment cleared through customs, there was an electronic failure which temporarily disabled the TV equipment while spare parts were obtained from the U.S., there were problems with the suspension of the camera rig, and other frustrations too numerous to mention. In spite of these, however, the photographic survey got off to an early start, and continued with little interruption throughout the summer, thanks to the diligence and ingenuity of the people involved. The sonar survey of the bottom, however, was far less fortunate. The sonar specialists who were to conduct the search had to postpone their arrival for two weeks, and shipping delays and electronic problems set back operations another week.

Before the search could start it was necessary to set up a navigation system to ensure that the same area was not covered twice, and to enable us to return to a specific point later. Had I not underestimated the magnitude of the navigational problem we could have begun setting up shore markers and surveying them into the chart while awaiting the sonar team. Instead, the time was spent surveying the loch for suitable places to search, and in collecting bottom samples. Once the sonar search was underway the nature of the loch itself presented many further difficulties. The bottom of Loch Ness is very irregular, and as it is necessary to tow the sonar equipment close to the bottom to achieve the required high resolution, the risk of collision with submarine ridges is high. We narrowly missed destroying the equipment more than once. The drag on the towing cable is considerable, and if more than about 100 metres is used the cable has to be steel-clad, necessitating the use of a heavy-duty power winch and a large towing vessel. Consequently, we were restricted to relatively shallow waters, which form a very small part of the loch. Furthermore, although the surface of Loch Ness is sometimes flat calm, especially in the early morning and late at night, it is usually quite rough, and the wave action tends to interfere with the sonar equipment, especially when it is towed in shallow water. Because of all these difficulties, far less of the loch was surveyed than we had originally hoped.

In spite of these obstacles several bottom targets were located which deserved further investigation, but this opened up a new set of problems. Targets in depths of about 40 metres of less are relatively easy to investigate by sending down a diver, but deeper targets require other methods. Although preliminary experiments were made with an underwater TV camera, the problems of location, even when the boat was directly over the top of the target, proved to be overwhelming. Small submarines have been used in the loch but the cost (at least $2000 per day) is prohibitive, especially when there are likely to be dozens of targets to investigate, most of which will turn out to be of no interest. It became evident to me that a sonar survey was an impractical way of trying to locate bottom remains, and that the only alternative was dredging. Preliminary dredging in deep water gave some

encouraging results, but it would have to cover a considerable area of the loch to stand any chance of success, and this would be an expensive operation. It is most unlikely that funds could be raised for such a capricious venture, especially in our present economic climate. The likelihood of recovering anything from the bottom is therefore remote.

There were high hopes of obtaining more and better underwater photographs this summer, but these hopes too were not realized. The single camera station was operated day and night for the greater part of the summer, but nothing of interest passed in front of the cameras. Yet when the odds against making a contact are assessed, the failure is put into perspective. The maximum camera range is about 10 metres, in a fairly narrow cone; the loch is some 25 miles long and about a mile wide.

People who have not looked into the problem of Loch Ness have every reason to be sceptical of the whole enterprise. I have no wish to try and persuade them otherwise. I am satisfied that there are large unidentified animals in Loch Ness. I did not arrive at this position overnight. Having examined the photographic and sonar evidence of 1972 and 1975, weighed the evidence of dozens of sightings, and visited the loch and spoken with some of the residents last December, I became all but convinced. During the summer I got to know many of the residents quite well, and was surprised to find how many of them had experienced a sighting. They were not readily forthcoming with their information, and the subject invariably arose casually during conversation. Although their accounts were very persuasive, it was my own personal experiences that removed any last lingering doubts.

While conducting the sonar survey of the bottom of the loch, on two separate occasions we had sonar contacts with moving objects in the water. It is possible that they may have been attributable to "noise", caused by our own screw-wash, but there was a third occasion when there could be no such doubt. Late one evening I returned to Temple Pier to look at the stationary sonar recorder which was monitoring water movements in the vicinity of the cameras. Several of the group were there, and they showed me a large signal which had been recorded just two hours before. From the tracing there could be no doubt that it had been made by a large moving object. As we discussed the record another large trace appeared on the recorder. I immediately went to the water's edge and looked all around to make absolutely sure there were no boats in the vicinity; only a week before a false alarm had been caused by a row boat. There was no activity in Urquhart Bay, or beyond, no boats, no noise, nothing. The surface was flat calm, without the slightest ripple, yet not far off shore something very large was moving in the water. I stayed watching for a long time, but nothing appeared on the surface and nothing more appeared on the sonar. I rowed out to spend a thoughtful night on the boat.

Some weeks before this incident I had had an interesting experience on the loch. We were headed north, towards Lochend, where we were going to conduct a bottom survey. It was still early morning and the heavy mist which had hung over the loch had dispersed to reveal a cloudless sky. The surface was mirror calm, disturbed only by our own passage, and we had the loch to ourselves. I was at the wheel and my colleague suggested I have my camera with telephoto lens ready, just in case. Conditions were perfect for a sighting. I adjusted the aperture setting on the 300mm lens, cocked the shutter, and placed the camera on the floor by my feet. Within minutes we both saw a large disturbance in the water about a mile to the west. We disengaged the engine and drifted, thinking at first that it must be our own wake, then realized that it was too large and too far away. We both observed the turbulence with binoculars and while watch was kept I reached for the camera. But by the time I tried to locate the disturbance with the camera, a matter of a few seconds later, it had already disappeared, and I did not even fire off a single shot. We waited for a short time and as nothing else appeared we got underway again. About an hour later, while the surface was still calm, we tried to create a disturbance of similar magnitude. When we had first seen the disturbance we had been cruising at about half speed, and even though we now opened to full speed, we could not produce a disturbance even approaching the magnitude of the first. We were therefore persuaded that what we had seen was probably not caused by our vessel, and no other vessel was in sight. While the possibility that it was our own wake cannot be completely ruled out (the surface conditions may have modified during the hour) the incident serves to show that even when a camera is close at hand and conditions are good, a photograph may not be obtained.

My summer was not as successful as it might have been, but I was able to come to some conclusions. While I am doubtful whether any animal remains will ever be recovered from the loch, I am confident that more underwater photographs will be obtained. As these photographs accumulate we will be able to build up a better picture of the inhabitants of the loch, but it will take a long time. Unless something unexpected should happen, Nessie's secret will be safe for years to come. The controversy will doubtless continue. The greatest experts on Loch Ness are those who have never been there or assessed the available evidence. I am very happy to leave all the discussion to them.

Dr. Chris McGowan is Associate Curator-in-charge of the Department of Vertebrate Palaeontology. He has lectured extensively on the Loch Ness phenomenon.

Right: Confined to the West Indies, the Lesser Antillean fruit bat (Brachyphylla cavernarum) *feeds on both fruit and pollen.*

Below: The higher elevations of volcanic islands in the Lesser Antilles are covered with lush rain forest inhabited by several rare species of forest-dwelling bats.

Stalking the Brown Flower Bat

The Strange Mammals of the West Indies

David Nagorsen

The West Indies are a group of islands that extend from Cuba and the Bahama Islands southward to the Grenada Islands near the coast of South America. Encouraged by the somewhat stereotyped images of sandy beaches and palm trees presented in the travel posters, most people consider the Caribbean Islands to be the ideal place to escape the agonies of winter. However, for a biologist with an interest in the zoogeography and evolution of mammals, these islands are fascinating because they support a unique fauna quite different from that of the continental mainland.

With the exception of animals transported by man, the fauna of the West Indies consists of mammals that have immigrated across the water barriers that separate these islands from Central and South America. As a result, the number of mammal species inhabiting the West Indies is relatively small. The native land mammals are especially few, and many species that are common on the mainland are conspicuously absent from the West Indies.

Although some mammals such as the mouse-opossum (*Marmosa*) and the rice-rat (*Oryzomys*) that inhabit some of the islands of the Lesser Antilles are relatively recent invaders from the mainland, many appear to be relics from the past. In fact, a considerable number of

these animals are now extinct and are known only from bones that have been found in caves.

One example of a living relic is the *Solenodon*, a primitive insectivore (a group that includes the moles and shrews) that is found only on the islands of Cuba and Hispaniola. This peculiar animal has no close relatives on the mainland and its precise origin is somewhat obscure. One plausible theory is that it is derived from an ancient stock of insectivores that inhabited North and Central America millions of years ago. Another curious group of terrestrial mammals confined to the West Indies are the hutias, a family of large, rat-like rodents found in the Greater Antilles and some of the Bahama Islands. Predation by man and the introduced mongoose have drastically reduced the populations of these animals and of the eleven known species, four are extinct and several more are endangered. There has been some debate as to precisely how land mammals such as the hutias reached the islands of the Caribbean. Possibly they were transported from Central or South America on rafts of floating trees or vegetation.

Capable of true flight, the bats have been more successful than terrestrial mammals in crossing the water gaps that separate the Caribbean islands from the mainland, and they have managed to colonize even some of the more distant islands. Not only are bats the most numerous mammals in the West Indies, but they are also amazingly diverse, and a number of different kinds of bats inhabit each island. Recent research has shown that the West Indian bat fauna is a complex mixture of both Central and South American elements that entered the West Indies at different times in the past.

The Mammalogy Department's interest in the West Indies began in 1965 when Dr. R. L. Peterson made an important collection of bats from Jamaica. From 1965 to 1968 two other staff members, Dr. J. R. Tamsitt and Dr. D. Valdivieso, collected a representative sample of the bats of Puerto Rico during their field studies on that island. The most significant result of their work was the capture of ten specimens of the red fig-eating bat *(Stenoderma rufum)* in the Luquillo National Forest. This bat was previously known only from fossil remains in caves and it was believed to be extinct in Puerto Rico. Mammalogy staff members have since visited

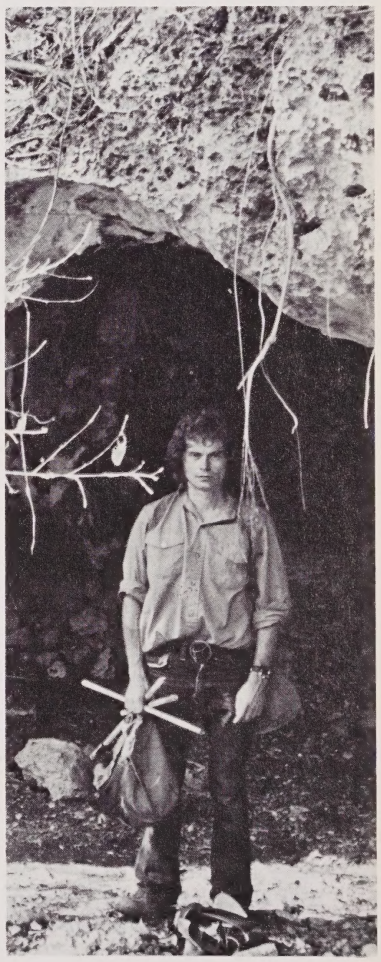
"Alex", a captive Solenodon. *This primitive mammal is known only from Cuba and Hispaniola. (Photo by J.A. Ottenwalder, National Museum of Natural History, Santo Domingo)*

The author at the entrance of a bat cave in Barbados.

other Caribbean islands and have made important collections from the Dominican Republic, the Virgin Islands, Antigua, Montserrat, Dominica, Martinique, St. Vincent, and Barbados. We have also recently obtained an excellent collection of Cuban bats from Gilberto Silva, a biologist at the Cuban Academy of Sciences.

I made my first trip to the West Indies in August 1974 with Brian Herbert, formerly of our department, to conduct field work in the Dominican Republic, a country that occupies the eastern two-thirds of the island of Hispaniola. With the exception of Cuba, Hispaniola is the largest island in the West Indies. It is also extremely mountainous and has the highest peak in the Caribbean, Pico Duarte (3175 m), in the Cordillera Central. Because of its diverse topography, this island has a relatively rich flora and fauna. Eighteen species of bats, three endemic, have been reported from Hispaniola and two rare terrestrial mammals, the *Solendon* and a species of hutian rodent, *Plagiodontia,* still survive there in a few areas. Our objective was to collect and study the bats of Hispaniola with an emphasis on the poorly known species.

One of the more memorable aspects of the field work was my first experience at cave exploration. The cave, located several miles from the town of San Cristóbal, was known to contain a large colony of the brown flower bat *(Erophylla bombifrons),* a species that we were particularly eager to obtain for chromosome study. This bat roosts during the day in dark, humid caves and emerges after sunset to feed on the nectar and pollen of flowering plants. Father Cicero, a biologist at the Museum of Natural History in Santo Domingo who is most knowledgeable about the island's bat fauna, directed us to the general vicinity of the cave, and there we hired a local farmer as a guide. The entrance was concealed by dense vegetation, and once inside we had to turn on our battery-operated headlights and hand lanterns because of the intense darkness. With many confusing twists and turns, our barefoot guide quickly led us deeper into the cave. Despite his enthusiasm, I became increasingly uneasy because I had no sense of direction, and I began to wonder how we would find our way out if the lights failed. The heat, humidity, and dust from the bat guano on the floor made the atmosphere oppressive and we were soon soaked in perspiration. We had still seen no



sign of the bat colony when we reached a narrow corridor at the rear of the cave. But as we stood in this narrow chamber, we heard a sound like rushing air coming from the high ceiling above us. Examining the area with our lights, which were beginning to dim from the drain on the batteries, we were startled to see hundreds of bats clinging to the roof of the cave. The sound that we heard was the sound of hundreds of fluttering wings. Disturbed by the lights, an unbelievable number of bats flying about in total confusion quickly filled the cave, making it impossible for us to see more than a few feet in front of our faces. With a long-handled butterfly net we collected our sample of bats in a matter of minutes, then left the area to prevent further disturbance to the colony. Although the experience in the cave was one that I will never forget, I must admit that I felt a certain relief when we returned to the entrance and stepped out into the fresh air and sunshine.

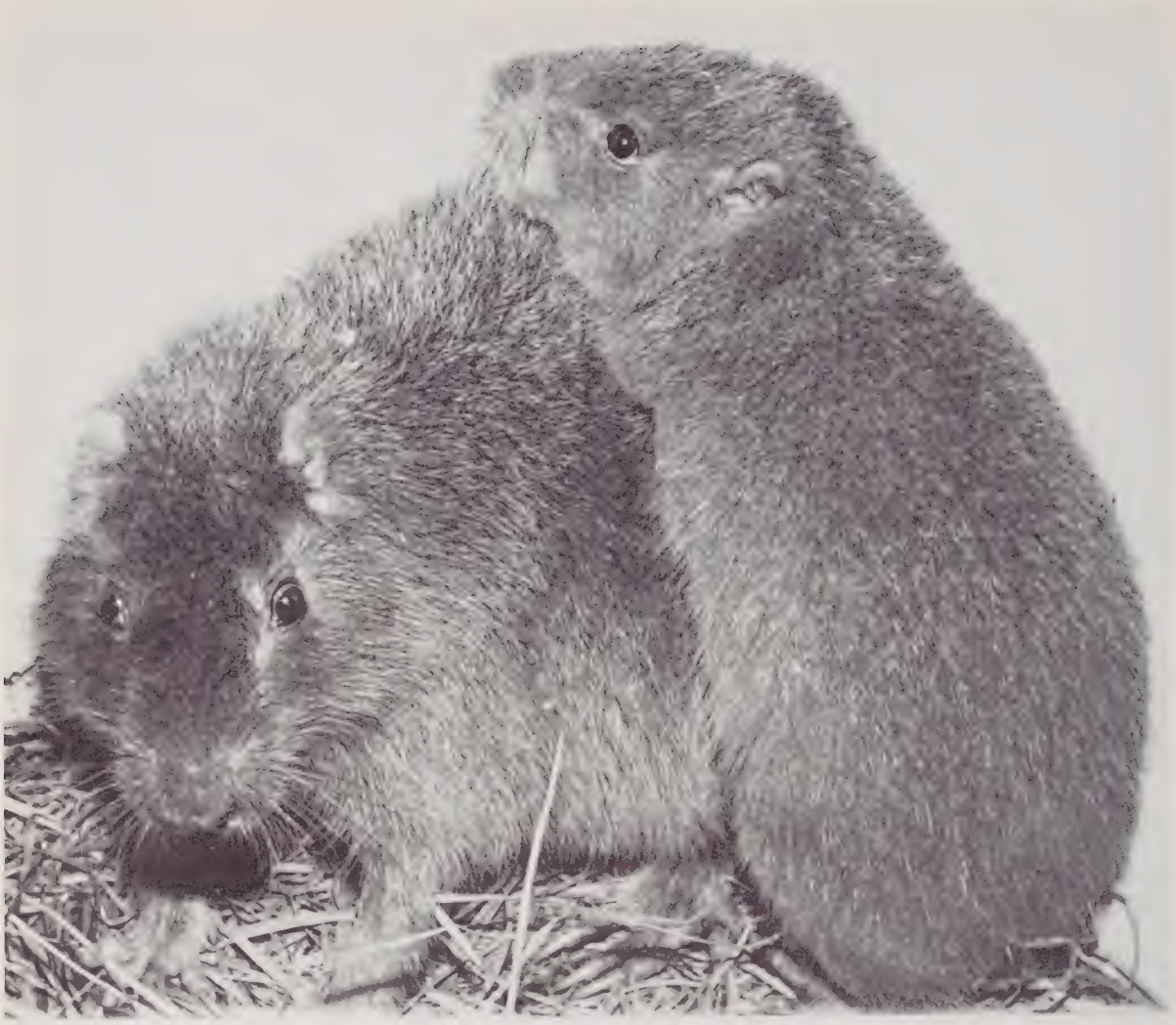
The highlight of our field work in the Dominican Republic was the unexpected capture of four specimens of the Dominican fig-eating bat *(Phyllops haitiensis)* and one Haitian flower bat *(Phyllonycteris obtusa)* in the Botanical Gardens on the outskirts of Santo Domingo (see *Rotunda,* Winter 1975). The Dominican fig-eating bat is closely related to the red fig-eating bat that was recently found alive in Puerto Rico, and to a similar rare bat that inhabits the forested areas of Jamaica, Cuba, and some of the islands of the Lesser Antilles. A nectar-pollen feeder, the Haitian flower bat has relatives on Cuba, Jamaica, and Puerto Rico, although the Puerto Rican form is known only from skeletal remains from caves and has never been taken alive. As part of our research, we prepared chromosome slides for these two rare species. Preliminary results from this study indicate that the various forms of these two bats inhabiting the different Caribbean islands are more closely related than was previously thought.

In May 1975, I made a second trip with Judy Eger to Antigua, Montser-

Above: Interior of a bat cave, Barbados.

Left: The red fig-eating bat (Stenoderma rufum) *was recently found alive in Puerto Rico. This rare bat has relatives on other Caribbean islands.*

Opposite page: Setting a mist net in the Botanical Gardens, Santo Domingo, Dominican Republic.



rat, St. Vincent, and Barbados, four islands of the Lesser Antilles. Our first stop was Antigua, a flat island that is partially volcanic and partially sedimentary in origin. That time of year is the dry season and from the air Antigua appeared to be parched brown, rather than the lush green colour typical of most Caribbean islands. However, we were able to exploit this lack of moisture to our advantage. By setting mist nets across the few streams and ponds that supported water we captured a considerable number of different bats that were attracted to the water to drink. We even succeeded in capturing a good sample of the common house bat *(Molossus molossus)*, a species that is generally difficult to net because it usually forages for insects above the tree canopy.

We also explored the only significant cave in Antigua, appropriately named Bats Cave. Located on the arid south coast, the cave is surrounded by incredibly dry and desert-like vegetation, with acacia trees and various cacti the dominant plants. Although we were sceptical about the chance of finding bats in the area, we found the interior of Bats Cave to be relatively humid and to contain a large colony of the Antillean fruit bat *(Brachyphylla cavernarum)*. The fur of these bats, we noticed, was dusted with a bright yellow pollen. As the only flowers in the vicinity of the cave were the yellow flowers of the numerous acacia trees, this bat must have been utilizing these flowers for food. The Antillean fruit bat feeds on both pollen and fruit, and it appears that during the dry season, when fruit is scarce, it may rely heavily on pollen as a source of food.

Volcanic in origin, Montserrat and St. Vincent are two of the more spectacular islands in the Lesser Antilles because of their striking relief. As a result of heavy rainfall at higher elevations, the mountains of these two islands are covered with dense tropical forests rich in plant species. Several rare forest-dwelling bats are known to inhabit the rain forests of Montserrat, St. Vincent, and some of the other volcanic

Left: Two captive specimens of the hutian rodent Plagiodontia, *a mammal that is found only on the island of Hispaniola. (Photo by J.A. Ottenwalder, National Museum of Natural History, Santo Domingo)*

Below: These guava fruits were carried into a cave by fruit-eating bats.

islands in the Lesser Antilles. Although we succeeded in collecting the more common species we did not capture any of these exotic bats during our field work.

Unlike Montserrat and St. Vincent, Barbados is a flat coral island where most of the original forest has been cleared for sugar cane production. Although Barbados lacks the biological diversity of some of the volcanic islands in the Lesser Antilles, it has a number of caves that support large colonies of bats. With the assistance of Ole Sorenson, a professional cave explorer, we visited many of the larger caves on the island and inventoried their bat colonies. Ole was employed by the Barbadian government to survey Harrison's Cave, the largest and most spectacular cave in Barbados, as a possible tourist attraction. If this cave is ever opened commercially, it is to be hoped that there will be minimal disturbance to the colonies of bats roosting there.

Despite our extensive field work in the West Indies,mammalogists are still discovering new species of bats in the mountainous rain forests on some of these islands. However, the emphasis of our current research is on the study and interpretation of our West Indian material, particularly bats, in order that we may answer some basic questions about their origin, zoogeography, and evolution. Because the bats of these islands have been isolated from each other and from mainland populations for a considerable period of time, they offer the biologist a unique opportunity to study the evolutionary process.

Our research also has practical applications. An understanding of the mammalian fauna of an area is essential for predicting the effects of disturbances to the environment. The opening of caves for tourists or the large-scale cutting of the original rain forest for timber are changes that could disrupt the ecological balance of an island and have a drastic impact on the populations of mammals. As conservation measures and political problems make scientific collecting more difficult, and as the demand for information about the faunas in various regions of the world increases, the collections of the ROM, such as its excellent collection of West Indian mammals, will become increasingly valuable to scientists and naturalists.

David Nagorsen is a Curatorial Assistant in the Department of Mammalogy, ROM. He graduated from the University of Guelph with an Honours degree in zoology and joined the staff of the Museum in 1972. His main interest is in the taxonomy and zoogeography of mammals, and he has been involved in research on the chromosomes of tropical bats and Ontario rodents. Mr. Nagorsen has conducted field work in the West Indies, the northern Yukon, and various areas in Ontario.

Omens of Disaster

When Heaven Blazed Forth the Death of Princes

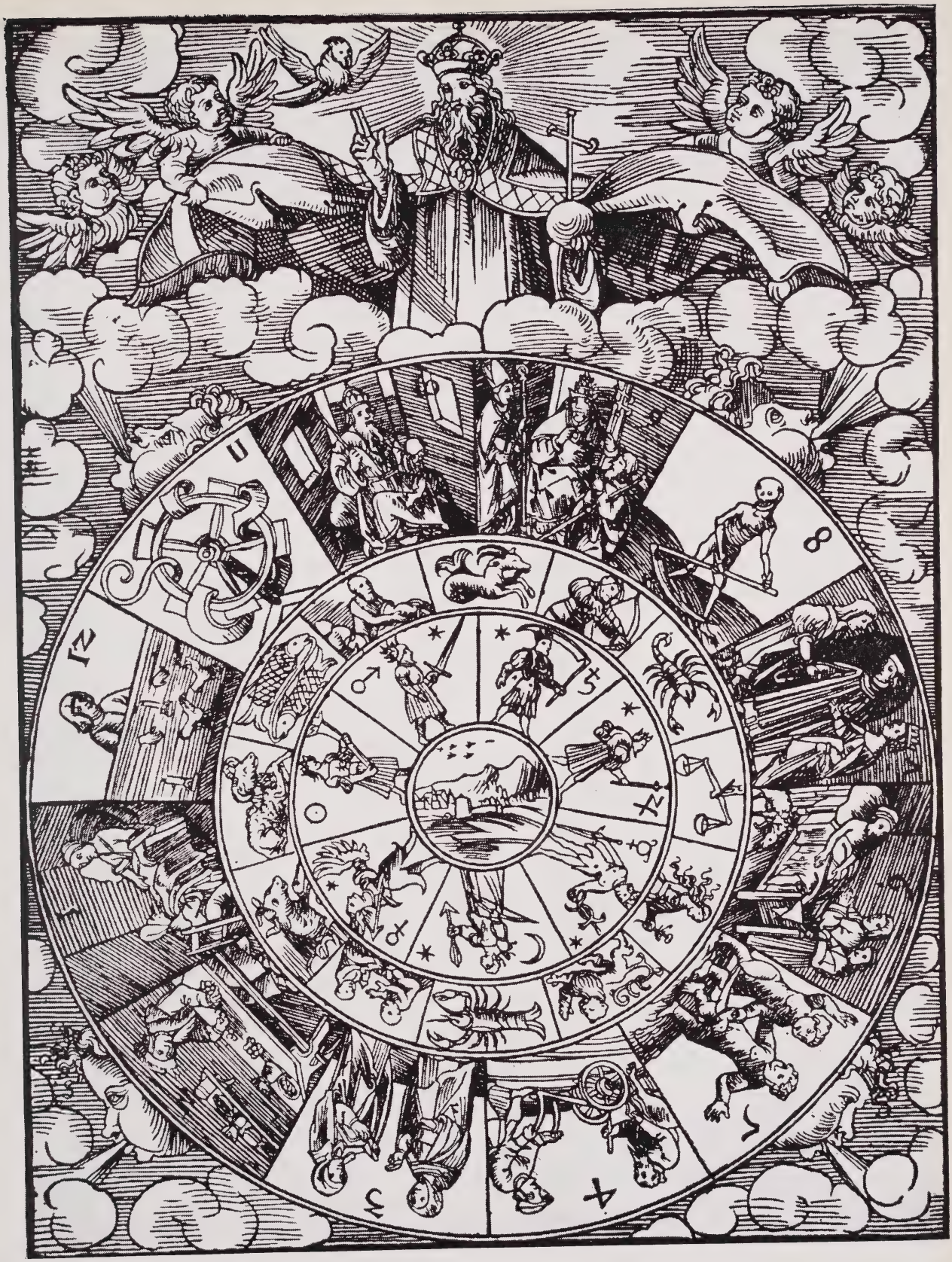
Henry C. King

Above: The close grouping of the sun, moon, and planets in Pisces in 1524 was believed to have caused great floods and a peasants' revolt. German woodcut.

Opposite page: Sixteenth-century astrological scheme of the universe. God presides over all aspects of human life (outer ring), each of which is related to the signs of the zodiac and the sun, moon, and planets.

A few Sundays ago I was urged by a speaker on a local radio programme to read my Bible and look for signs and omens that would herald the Last Days, or end of the temporal order. Such warnings of the end of history and beginning of the millennial sabbath are as old as Christendom itself, and indeed older. Coupled with them, at least in Christian eschatology, are prophecies of celestial omens of an apocalyptic nature. Not only will the heavens open but signs will appear in the sun, moon, and stars. We read in Matthew and Mark that the sun and moon will be darkened, stars fall from the sky, and the power of heaven be shaken. Such prodigies, however, spell disaster only to blasphemers, fornicators, evil-doers and other reprobates. To God's elect, the saints and righteous, they herald the glory of Christ's Second Advent and the ultimate spiritual reward, a place in God's eternal kingdom. Even so, all men, good and wicked, "will faint with terror at the thought of all that is coming upon the world" (Luke XXI, 26).

Although the precise time of the end of human history is undisclosed and known only to God, numerous scholars throughout the centuries, restless at Christ's failure to reappear, have interrogated prophetic statements in the Book of Daniel and in Judaeo-Christian apocalypses. Thus Joachim of Fiore in the 12th



century taught that Christ's Parousia would occur in 1260. John Craig, friend of Newton and prebendary of Salisbury, fixed on 3150, and William Miller, pioneer in the cult of Seventh-day Adventism, specified some time during the Jewish year 21 March 1843 to 21 March 1844. Others, no less influenced by New Testament eschatology and apocalyptic literature, kept a watchful eye on the heavens and gave extravagant interpretations to events which, in the light of modern science, have little if any moral significance.

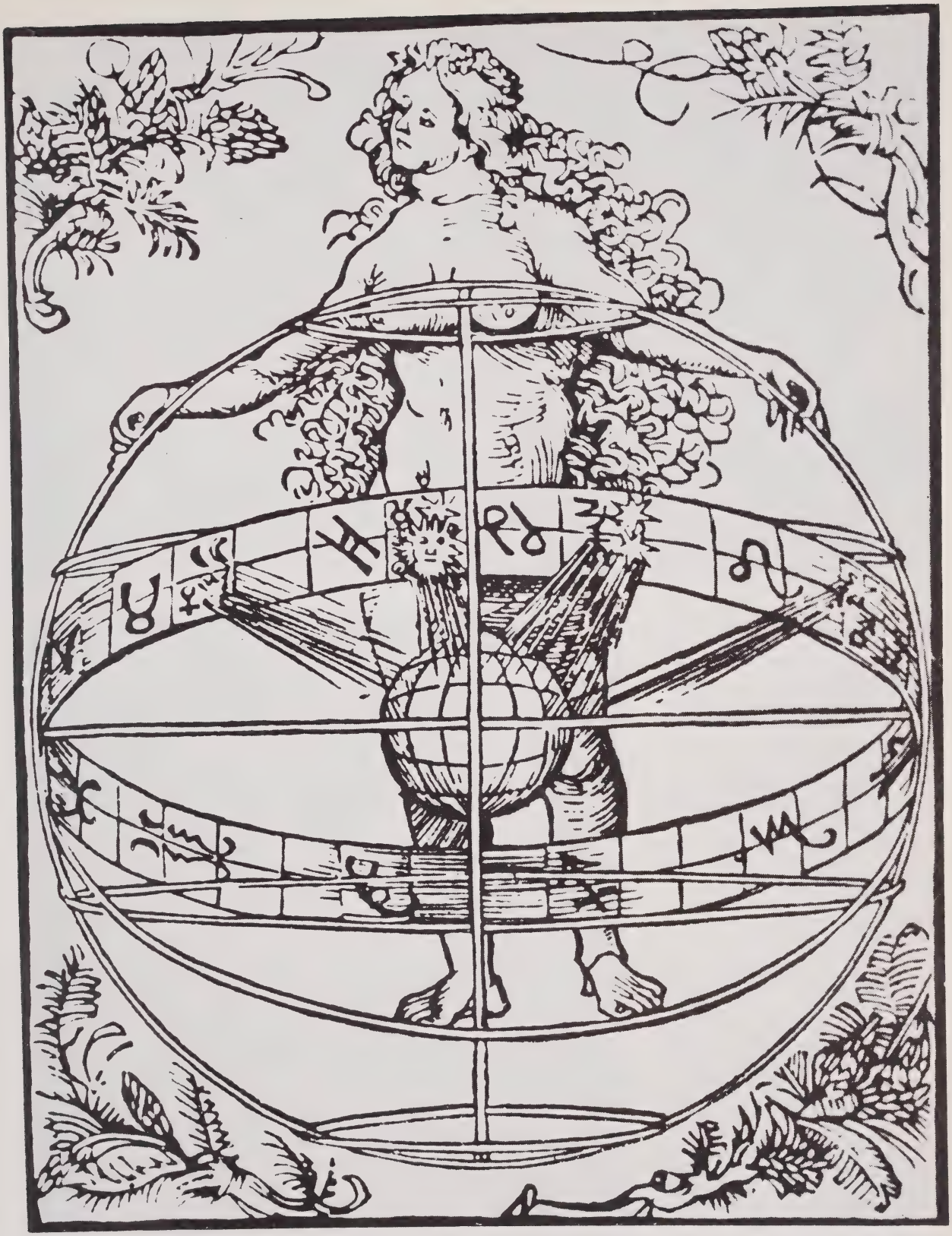
The world of nature in early Christian thought certainly had room enough for the marvellous. As the manifestation of God's creative activity and the stage on which was played the drama of Man's fall and redemption it revealed and expressed His character. As the instrument of God's messages and revelations it enabled Him to warn erring mankind through earthquakes, tempests, displays of aurorae, eclipses of the sun and moon, showers of meteors, large comets, bright supernovae, and the close groupings of the planets. Astronomers and diviners therefore had the important task of interpreting celestial events in moral terms, that is, of discovering God's immediate intentions. In so doing they followed the astrologer-priests of Sumeria and Babylonia who applied the arts of divination to the stars. This activity, known as natural astrology, is not to be confused with judicial astrology, or the casting of horoscopes, for which a knowledge of astronomy is of virtually no account.

Studies of this kind allow free reign to sensationalism and pander to the craving for things that are new and unusual regardless of their intrinsic merits. As Seneca, conventional Stoic philosopher and adviser to Nero, aptly put it:

"The whole choir of heavenly constellations under this immense vault, whose beauty they diversify, fails to attract the attention of the multitude; but should anything extraordinary appear, all faces are turned toward the heavens. The sun has spectators only when he is eclipsed. The moon is observed only when she undergoes a similar crisis. . . . The same thing takes place in respect to comets. If one of these flam-

Opposite page: Urania holds the sphere of heaven in which planets in Taurus, Gemini, Cancer, and Leo influence events on a fixed central earth. German prognosticon for 1503-04.

Below: Assembly of the sun, moon, and planets in Cancer. German woodcut, 1504.



ing bodies should appear of rare and unusual form, everyone is anxious to see what it is; all the rest are forgotten whilst everyone inquires concerning the new arrival; no one knows whether to admire or to tremble; for there are not wanting people who draw from thence grave prognostics and disseminate fears."

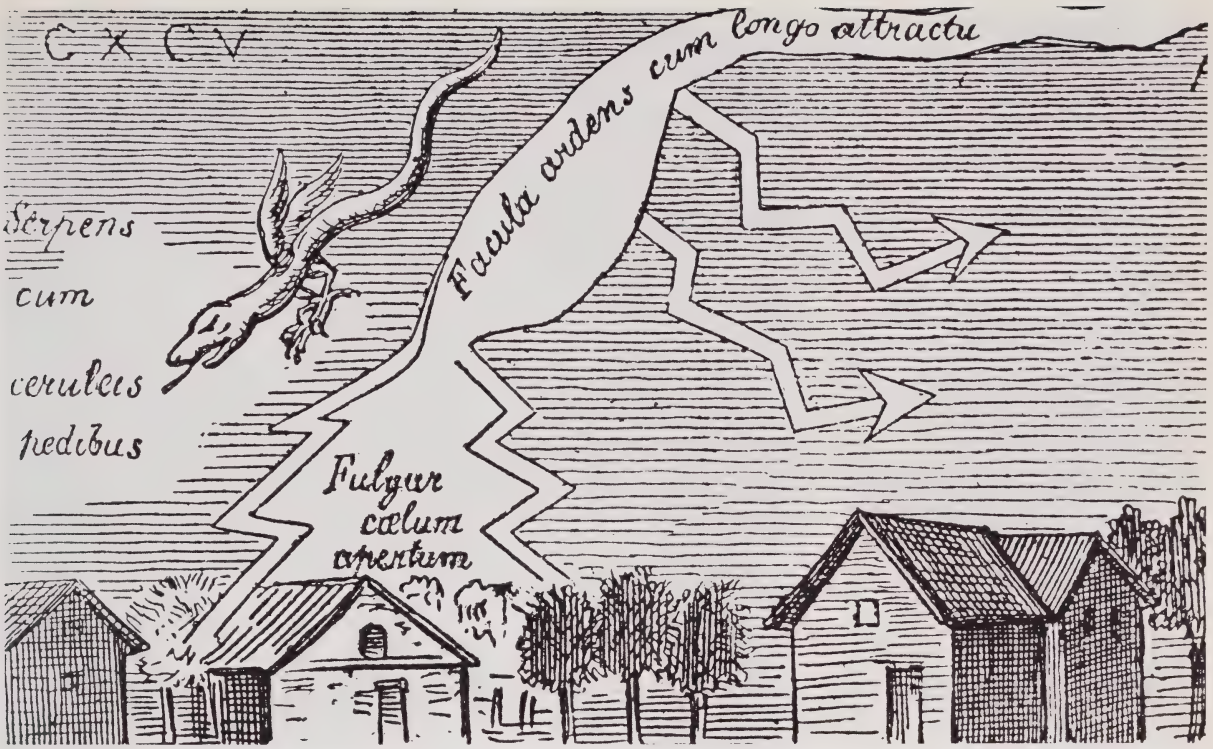
Seneca suggested that comets are subject to physical laws and move far beyond the sphere of the moon. Yet he never completely freed himself from the old belief that they caused cataclysmic changes on earth. Of the comet in A.D. 62 he wrote: "Everywhere there have been violent storms; in Achaia and Macedonia several towns have been overthrown by earthquakes." Two years later, when Nero was far along the road to infamy, another comet appeared. Tacitus, historian and friend of Pliny, voiced the popular belief that the comet was a presage which Nero expiated with the blood of the illustrious. In A.D. 65, Nero ordered the death of Seneca, who anticipated the sentence in Roman fashion by opening veins in his arms and legs. In the following January yet another comet appeared; Josephus described it as standing like a sword over Jerusalem during the city's sufferings at the hands of Titus. This was Comet Halley, whose period of about seventy-six years was perhaps known to the sages of Israel and which became one of the most awesome of celestial visitants.

The appearance of Comet Halley in A.D. 989 and of another impressive comet in 1006 heightened the widespread belief in Western Europe that the end of the world was imminent. For a thousand years, according to Revelation, "the dragon, that serpent of old, the Devil or Satan" had been chained, but he would break loose, seduce the nations, and muster them for battle. In that very year, A.D. 1000, an eyewitness wrote, "The heavens opened, and a kind of flaming torch fell upon the earth, leaving behind a long track of light like the path of a flash of lightning. Its brightness was so great that it frightened not only those who were in the fields, but even those who were in their houses. As this opening in the sky slowly closed, men saw with horror the figure of a dragon, whose feet were blue, and whose head seemed to grow larger and larger."

William of Malmesbury, writing in 1060, records how a bright comet, probably that of 1006, sent a long and fiery train across the sky and caused a monk at Malmesbury to bow down in terror. "Thou art come!" cried the monk. "A matter of lamentation to many a mother art thou come; I have seen thee long since; but now I behold thee much more terrible, threatening to hurl destruction on this country." Destruction did follow, but not until 1066, when Comet Halley seemed to hover over England like a sword of correction and was held to presage the defeat and death of Harold and the success of Norman arms.

Right: Comets signify catastrophic wars. German prognosticon, 1532.

Opposite page: Drawing from a 17th-century text on comets of an apocalyptic sky event that occurred in A.D. 1000.

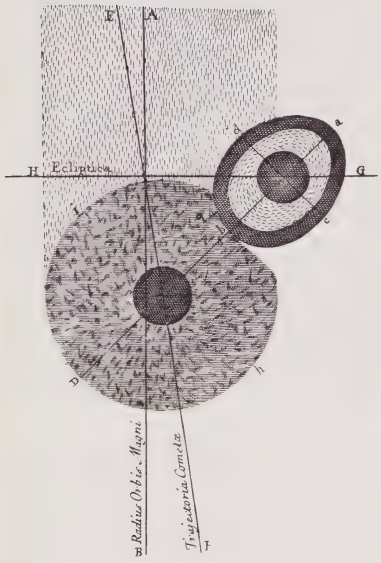


Halley's successful prediction that the comet of 1682 would return in 1758 was the first great triumph of Newtonian celestial mechanics. Even so, the comet's subsequent returns were invariably accompanied by forebodings on the part of those unfamiliar with astronomy. When it was learned the earth would pass through the comet's tail during May 1910, several writers foretold the asphyxiation of all mankind, but in the event nothing unusual was either seen or felt.

On 30 June 1908 the impact of a body of cometary size caused extensive forest destruction at Tunguska in Siberia. Later, in June 1921, the earth moved across the path of Comet Pons Winnecke, but fortunately the comet passed its perihelion a few days too early for a collision to occur. Not only are such collisions extremely rare but the results would probably be local. William Whiston, however, thought otherwise. Successor to Newton in the chair of mathematics at Cambridge, Whiston associated human destiny with the great comet of 1680. Halley had erroneously given the comet a period of 757 years, and Whiston, working backwards with the assistance of history and the Scriptures, concluded that it was responsible for giving the earth its initial motions. A later close approach, he argued, had enveloped the earth in the comet's tail and given rise to the Deluge, while a future collision would bring about the end of the world as predicted in Revelation. Whiston stood almost alone in holding these and other heterodoxies, but he voiced them with such enthusiasm that in 1701 he was forced to resign from his professorship.

The belief that the world might end at or soon after the close of the first millennium of the Christian era received support in August 1007 when the sun, moon, and five naked-eye planets assembled in the constellation of Leo. Berosus, Philolaus, Plato, Seneca, and others subscribed to the idea of the Great Year, a long period in cyclical time after which the planets would return to their original geocentric positions and every event in history would then be repeated. Some Christian writers, weaned on the fantasies of Revelation, considered that nothing less than a cosmic catastrophe would take place, with its precise nature determined by the particular part of the zodiac favoured by the sevenfold assemblage. If the grouping occurred in Pisces, Capricornus, or Aquarius, a universal deluge would engulf mankind; if in Leo or Cancer, cosmic fire would shrivel the earth; if elsewhere in the zodiac, storms, fires, and earthquakes would bring disaster no less complete.

Johann Stöffler, finding that Mars, Jupiter, and Saturn would meet on 20 February 1524 in the Fishes, predicted a repetition of the Noachian deluge. As professor of mathematics at Tübingen he had so great a reputation that his prophecy terrified a large part of the German population. People in low-lying areas sold their property and moved to higher ground, many bought or built boats, and a physician at Toulouse constructed an ark large enough to hold his family, friends, and possessions. In February not a drop of rain fell on Tübingen and Western Europe experienced one of its driest months. Stöffler seems to



Above left: Natural cause of Noah's Flood according to Willam Whiston. A comet travelling along line EF grazes the earth, distorts the earth's crust, and releases subterranean waters which join torrents from the comet's tail.

Above right: Signs in the sky foretell a bad harvest. German woodcut, 1627.

have been as angry as his dupes at this disappointing turn of events, but so great was his vanity that he predicted another cataclysmic event for 1588, knowing full well that he would not live to see it.

A similar prediction, for 3 October 1533, resulted when Michael Stifel, a Lutheran pastor and student of mathematics, juggled with mystic numbers in the books of Daniel and Revelation. The fact that he had previously calculated that Pope Leo X was the Superhuman Beast mentioned in Revelation should have warned his hearers. Nevertheless, peasants in Holzdorf accepted his assurances, sold their goods, and abandoned all idea of work. On the fateful day Stifel rose early, and led a great crowd of devout but uncritical believers in open-air prayers and hymns. But pastor and flock looked in vain for signs in the heavens and Christ's Second Coming. Aware at length of the full extent of Stifel's deception, the angry peasants would have lynched him had he not sought refuge in Wittenberg prison. He was eventually released through the personal intervention of Martin Luther, no doubt after giving assurances that he would never again indulge in prophecy.

For some curious reason late 11th-century annals of Western Europe are silent concerning the supernova that blazed out in 1054 in the constellation of Taurus. It was recorded in China, however, where its sudden and transitory appearance earned it the name "guest star". In 1572 a similar outburst in Cassiopeia gave rise to intense speculation. Protestant preachers likened it to the star seen by the Magi and urged their flocks to repent in readiness for Christ's Second Advent. Catholic authors foretold the victory of their Church, and with Luther in mind, warned

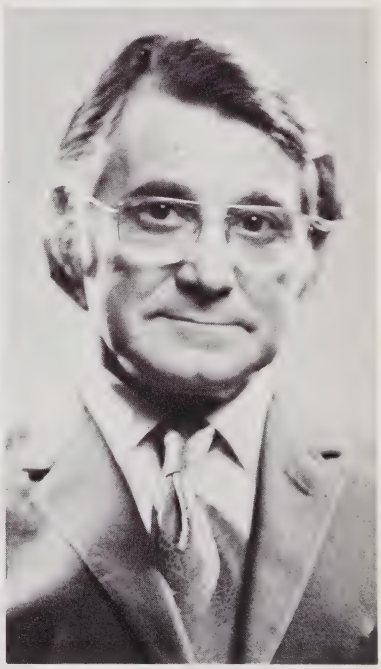
A comet signifies a deluge and the murder of papists. German prognosticon, *1521.*

Henry C. King's interest in astronomy began at the age of thirteen, and his fascination with the night sky led him to study optics and to build his own telescopes. He took his degree in astronomy and mathematics at the University of London, and later gained his M.Sc. and Ph.D. in the history and philosophy of science. In 1958, Dr. King was appointed scientific director of the London Planetarium, and at the same time served as President of the British Astronomical Association. He was appointed Curator of the McLaughlin Planetarium at the ROM *in September, 1966. Dr. King is the author of several books, including* The History of the Telescope, Exploration of the Universe, *and* Pictorial Guide to the Stars. *He has recently completed a detailed history of planetary machines and astronomical clocks.*

against false prophets and disciples of Satan. Tycho Brahe and a few others attempted to determine the star's distance, but without success, although Tycho concluded that it was generated in the aetherial regions of the highest heaven.

Tycho's study of supernova 1572 threw suspicion on the time-honoured Aristotelian dictum that nothing new can arise in the heavens, or conversely, that all change is restricted to the scene terrestrial. The suspicion soon became a conviction, for Tycho found that the comet of 1577 was at least as distant as Venus and therefore had planetary status. By then Copernicus had prepared the way for the dethronement of Man from his central place in the world system, but centuries of patient observation and measurement had to elapse before the full nature and extent of the change became apparent. In the process the stage sky with its signs and omens was swept aside, the entire span of past human history was seen to be no longer than a cosmic instant, and Man began to appreciate the relative ease with which he himself could bring about the end of life on earth and the supreme terror of final time.

"Omens of Disaster" is the title of the late fall—mid-winter show at the McLaughlin Planetarium, in which various striking events in the night sky are reproduced and described in the light of past and present knowledge.



A New Gallery for the Museum

Prehistoric Man in Ontario

Peter Storck

Museums have many reputations in our society—both deserved and undeserved—but perhaps one of the commonest notions is that they are as changeless and immutable as the artifacts they contain. This is a theme of numerous jokes in both popular and academic circles. Nearly everyone has heard stories about galleries that have remained unchanged for decades, or about fossils that have been found in museum storerooms, still in their original packing cases, after apparently having been forgotten for twenty years or longer. It might seem to some that galleries are created in perpetuity, like burial plots, but really this is not so. In the case of this Museum, the galleries are in a constant state of change with new ones being planned or built and others renovated almost continually.

In the fall of 1974 we in the David Boyle Room (unofficially known as the "Long Room") first heard that it would be possible to build a new gallery on Ontario prehistory. The Museum had not had an integrated display on Ontario prehistory for more than a decade, in part because of a shortage of space, and consequently we were most eager to show the public the results of our field work and something of the Museum's large and very excellent collection of artifacts. In

Above: This diorama in the new Ontario Prehistory Gallery depicts a Late Woodland period Iroquoian village scene of A.D. 1400 or later, in which a woman teaches her daughter how to make pottery.

Left: Another diorama shows an Early Palaeo-Indian campsite of about 11,000 years ago. These were probably the first people to occupy Ontario after the final retreat of the glacial ice. To adapt to the cold climate they may have fashioned their clothing from the skins of barren ground caribou.

short, we wanted to show that we were alive and well and very active, and had not fossilized.

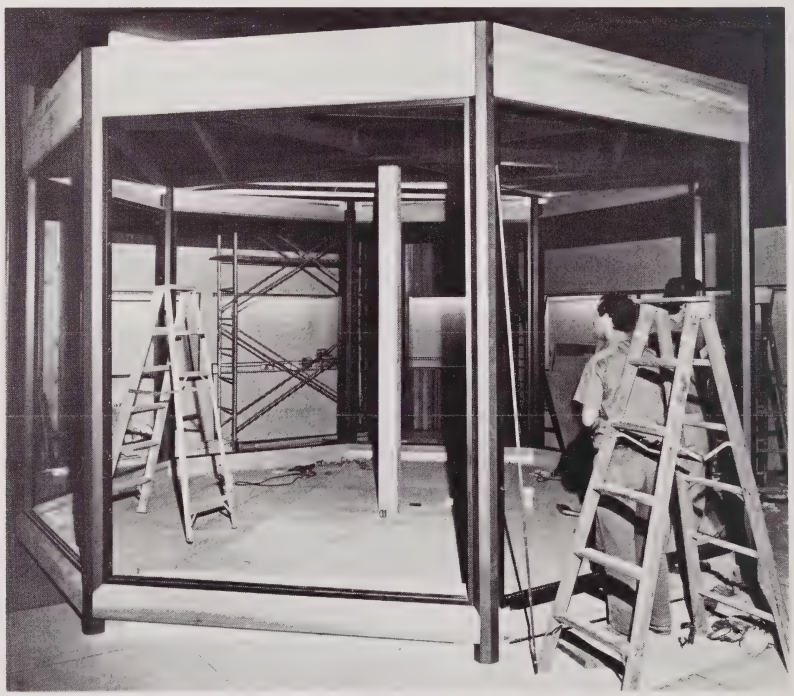
The next question was like a dash of cold water—how to do it? We had ten or twelve thousand years of prehistory to fit into a room not much bigger than a double-car garage and, of course, we wanted the gallery to appeal to the casual visitor as well as to the serious student. The effective display space, I soon discovered, was much smaller than the cubic capacity of the room. The best space for displaying objects in any gallery is a relatively narrow band measuring five or six feet wide and centered a little over five feet above the floor—the eye level of the average adult. Above and below this, the space is more distant from the viewer and is therefore more difficult to use except for displaying graphics. In addition, a main corridor passes through one end of the room and the gallery had to be designed so as not to block the movement of people. After thinking about this awhile, I mused on my now obviously quaint ideas about how to design a gallery.

Confronted with a bare room and no overall concept or plan, the first and most difficult thing we had to find was a good organizing idea.

As it turned out, the final plan of the gallery was determined by a chain of small interrelated decisions that simply seemed to follow one another naturally, almost without our intrusion. The first step happened when I heard quite by chance that the manikins in the ethnological exhibit that was being dismantled to provide space for the new gallery were going to be placed in storage. This single happenstance pretty well determined the course of our subsequent planning. With the manikins we could use both archaeological and ethnological materials to create full-size life scenes illustrating certain aspects of prehistoric life. By including displays of archaeological work in progress, we would also contrast the richness of each life scene (with all of its perishable objects) with the relative poverty of the archaeological traces that survive the passing of time. Finally, we could show the different kinds of evidence an archaeologist uses in reconstructing the ways of life of peoples long dead.

Once we had decided to build dioramas, the next problem was *where* to build them. I thought it would be interesting to try to tie in the various life scenes with the important concept of stratigraphy. In a stratified site, the age of the different levels or living surfaces increases with depth, unless they have been disturbed, and I thought it might be possible to show the relative ages of the different dioramas by placing them on different levels and linking them physically to draw greater attention to these differences. It would, of course, have been possible to link the dioramas together by placing them in a row along one wall of the gallery but this approach seemed to be rather uninteresting. Instead, we decided to place the dioramas together in the centre of the gallery in a large case visible from all sides.

After a lot of sketching and some model building with cardboard and clay, we decided to build an eight-sided case completely enclosed with glass. The case would contain almost 400 square feet of glass and weigh a couple of thousand pounds. By partitioning off the inside of the case into four units of unequal size, we would have space for four separate dioramas—each illustrating one as-



Planning the presentation of the dioramas was a tricky problem. The solution, shown here under construction, was an eight-sided, glass-enclosed case that would link the scenes chronologically.

Left: Wild rice was probably an important food resource. This scene shows an Algonquin wild rice harvesting site of about A.D. 1200 in which the rice grains are being dried on a rack over a low fire.

Below: One of the many artifacts on display in the gallery is this Black Duck culture pottery vessel with part of its birch bark lid. (Hungary Hall Mound 1, Rainy River District)

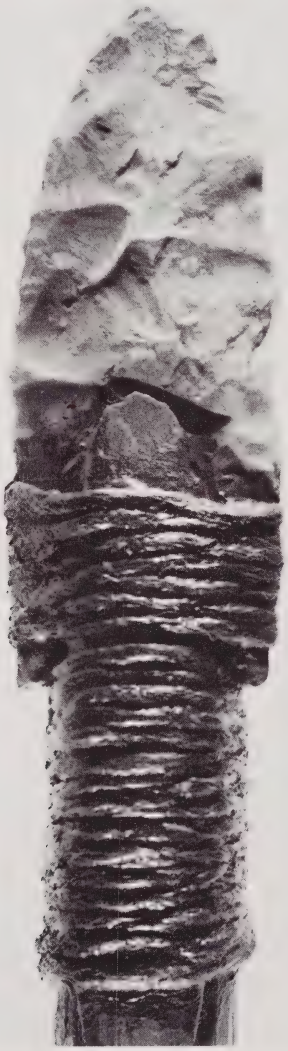
pect of the way of life of a particular people during a major time period in the prehistory of Ontario. The dioramas could be physically linked around the exterior of the case simply by not extending the interior partitions all the way out to the glass. In an attempt to show stratigraphy, I initially suggested building a sloping floor or ramp around the central case which would begin at a level three or four feet high at the entrance to the gallery and gradually descend to floor level at the exit. By descending along the ramp, the visitor would be, in essence, walking back through time. But for various technical reasons the ramp didn't prove practical and so, as a compromise, we applied the idea to the inside of the octagonal case instead. Each diorama was built at a different level inside the case. The most recent diorama, the Iroquoian village scene of A.D. 1400 or later, is at the highest level while the most ancient diorama, the Early Palaeo-Indian camp of ten to twelve thousand years ago, is at the lowest level. Consequently, the visitor can actually walk through time, either forward toward the present or backward into the past, by simply walking one way or the other around the outside of the case.

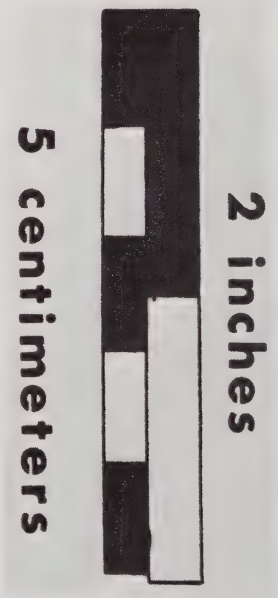
The dioramas portray four life scenes. The first shows a mother teaching her daughter how to make pottery in an Iroquoian village some time after A.D. 1400; the second, an Algonquin Indian harvesting wild rice around A.D. 1200; the third, a woman burying the skeleton of a friend or relative some time around 2000 B.C.; and the fourth, an Early Palaeo-Indian hunter making a fire about 9000 B.C. These particular scenes were selected because they illustrate an aspect of life that was either characteristic of the time period or represents our knowledge of it. The postures of the manikins also influenced our thinking to some extent; in the end these figures influenced not only the overall plan of the gallery but the nature of the exhibits themselves. Fortunately, these excellently sculptured figures fitted into these scenes very well and we were able to use them without having to make extensive modifications. The manikins are museum pieces in their own right, having been made for a Canadian National Exhibition in Toronto some time in the early 1920s.

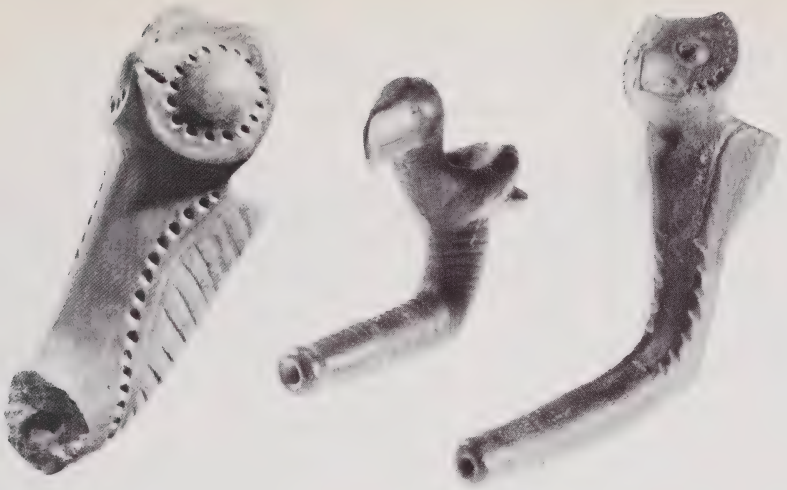
The dioramas are intended to blend archaeology and ethnology as much as possible. Consequently, several of the artifacts are ethnographic specimens loaned from the Ethnology Department. Aside from the clothing, only a few of the artifacts had to be simulated and, in fact, we probably used fewer than a dozen casts or reproductions in the entire gallery.

Above: Early Palaeo-Indian peoples in Ontario were accomplished big-game hunters. This painting by Paul Geraghty shows them hunting the barren ground caribou.

Right: Early Palaeo-Indian "fluted" projectile point hafted to a simulated bone foreshaft. Both faces of the point were usually fluted, by removing large flakes, so that the base could be more firmly attached to a spear.







Iroquois pottery pipes, used for smoking tobacco, were often very elaborate and included animal and human effigy forms.

While the dioramas bring to life certain activities that occurred at different times in the past, the major part of the story of the prehistory of Ontario is told in the eight large wall cases around the gallery. Each case deals with the cultures and events of a specific time period and so provides a broader context for understanding the corresponding diorama of that period. The artifacts in the gallery were selected from over a quarter of a million specimens in the Museum's Ontario archaeology collection and include much of our finest material. Many of the artifacts displayed in the gallery are unique or very rare in Ontario. In addition, we borrowed several artifacts and casts from other institutions in order to display material from specific cultures that are not represented in our own collections.

One wall of the gallery displays a photographic exhibition that shows the kinds of activities involved in archaeological field work, as well as the boredom, fatigue, and lighthearted bantering spirits in which that work is done.

Hanging from the ceiling above the wall cases are a number of large reproductions of Indian rock paintings. While the ages of these paintings cannot be accurately determined, it is thought that many of them were probably painted during the historic period. They portray animals, humans, geometrical designs of unknown meaning, and mythological figures and were probably made by shamans ("medicine men") to record powerful visions.

In the two years that elapsed between the dismantling of the previous exhibit and the completion of the new gallery, a wooden barricade closed off this area of the Museum. To the general public (and possibly some of the Museum staff as well), things must have seemed fairly static. There may have been those who, unaware of our activity, were confirmed in their belief about the changelessness of museums. Yet a large number of talented people from no fewer than nine different departments, as well as people from outside the Museum, worked in their own areas of special competence to complete this gallery.

Here as elsewhere throughout the Museum, the apparent changelessness of the galleries and their serene, tranquil atmosphere are only a thin facade—a facade that masks the overflowing IN baskets, the backlogged work orders, and the full appointment books of every staff member. The tranquillity of the galleries rarely permeates the workshops, labs, and offices, and then only briefly, when a field project or display or book is completed.

After the completion of this gallery our brief period of tranquillity passed quickly. Although our work has turned again to research, we are looking forward to the possibility of building an even larger gallery in a new, much-enlarged Museum, perhaps in the not too distant future.

Lorne Fromer

Dr. Peter Storck is Associate Curator in the Office of the Chief Archaeologist. He received his B. Sc., M. Sc., and Ph.D. from the University of Wisconsin and has broad training in the natural sciences, including geology, botany, soils, and zoology. Since 1960 he has done yearly field work on archaeological sites from southern Alaska to central Mexico. His primary interest in Ontario is the initial occupation by hunting and gathering peoples at the end of the Pleistocene epoch, ten to twelve thousand years ago.

The Growing Collections

An extensive collection of contemporary Australian aboriginal sculpture and bark paintings has recently been donated to the Ethnology Department by Mrs. Rosamund Campbell of New Brunswick. These superb pieces were part of an exhibition of primitive art at the New Brunswick Museum in 1970, and form the first major collection of contemporary art of the Australian Native people to be acquired by the ROM.

Francis Kagige is a noted Ojibwa artist whose paintings have been exhibited in North America and Europe. His work has become well known to Canadians through the publication of a children's book of Native folklore, *Tales of Nokomis*, which was written by Patronella Johnston and illustrated by Kagige. The fifteen paintings which were published in *Tales of Nokomis* have been acquired by the Ethnology Department through a generous grant by the Richard Ivey Foundation of London, Ontario.

Salish baskets are famous for their excellent design and construction. Today, the traditional art of basket making in this region of the Northwest Coast is limited to a few elderly women. The Ethnology Department has arranged with Mrs. Diana Daly of Sechelt, B.C. to collect examples of basket work for the Museum, to provide excellent specimens for display and opportunities for study.

M.T.

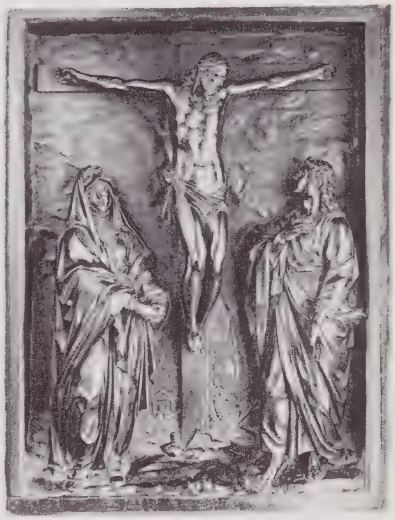
In the space of a few short years, mainly since 1970, the European Department has succeeded in building up an impressive collection of Renaissance and Baroque bronzes of national and international importance. The Museum's most recent acquisition is one of the finest yet, a bronze relief of the *Crucifixion* tentatively attributed to Gasparo di Donato Mola (1565-1640). It combines a figure in the round, that of the crucified Christ, cast separately and attached to the background of the relief with pyramid-headed bronze nails, and two figures of the Virgin and St. John in such high relief that they are virtually free standing, against a low-relief background depicting the Temple and buildings of Jerusalem. The monumental scale, with the three main figures grouped in a triangular composition that completely fills the boundaries of the relief, shows a return to the compositional values of the High Renaissance that was characteristic of the late Renaissance and heralded the early Baroque. The reduction of details to bare essentials is typical of the spirit of the Counter-Reformation.

The attribution of the relief to Gasparo Mola derives from similarities with Mola's relief panel of the *Crucifixion* made in 1599 for the doors of the Cathedral at Pisa. Mola was originally a goldsmith, and worked for the Florentine court as goldsmith, armourer, and die cutter. In the 1590s he was occupied in making crucifixes after a model by Florence's presiding sculptural genius, Giovanni Bologna. This must have been one way in which Mola absorbed characteristics of the Bologna style; and elements from the Bologna style are strikingly evident in this relief.

The attribution to Mola is tentative, as another candidate has been put forth as the possible originator of the ROM's relief: Taddeo Landini (1561-1596), a brilliant sculptor skilled in the art of bronze casting whose works show similarities to the style of the *Crucifixion* relief. It has been suggested that Landini's work in Tuscany could have influenced Mola.

Regardless of the attribution, the *Crucifixion* is an outstanding example of Italian bronze sculpture of the late Renaissance, and is an acquisition of the greatest importance.

K.C.K.



Important acquisitions to the mineral collections in recent months are the species kryzhanovskite and metavivianite (both from the Yukon Territory), raguinite (Yugoslavia), gaudefroyite and jouravskite (both from Morocco), greigite (Corsica), arsenosulvanite (Japan), inderite and pseudoboleite (both from California), bismoclite and strashimirite (both from Nevada), and garronite (Nova Scotia). All these are species which were not previously represented in our collections.
Dr. A. R. Graham presented the Type material of cerianite to the ROM. Dr. Graham described this species in 1955, from Lackner Tp., Sudbury District, and the total preserved material consists of a few crystals weighing only a few milligrams.
Dr. Gunter Springer of Falconbridge Metallurgical Laboratories, Thornhill donated the Type material of a new mineral, falcondoite, which is the nickel analogue of sepiolite. A fine suite of specimens from the Bluebell Mine, Kootenay District, B.C. was obtained by exchange with the Museum of Natural Sciences (National Museums of Canada). These include fine examples of quartz, galena, pyrrhotite, sphalerite, arsenopyrite, and calcite. Some fine specimens were purchased from a private collection and among the pieces acquired by ROM, the following are noteworthy: part of a bi-coloured fluorite crystal from Madoc, Ontario and two faceted gems which were cut from it (green 15.6 cts., blue 8.3 cts.). A fine olivenite from Tsumeb, South West Africa fills a gap in our Tsumeb suite. The specimen shown in the photograph is a rosette of catapleiite crystals on natrolite. The rosette itself is about 7 cm x 5 cm and 2 cm thick. It is from Mont St. Hilaire, Quebec and is one of the finest specimens of this mineral known; as far as we know only five or six others of similar size or quality are in other collections.

R.I.G.

Among the many specimens new to the Vertebrate Palaeontology collections is this complete skeleton of the 70-million-year-old fish Xiphoctinus. Measuring 10'7" from tail to snout, it is shown being prepared by technician David Fisk.

The Far Eastern Department is enriched by a group of finds from the important prehistoric site of Ban Chiang in northeastern Thailand. In accordance with the Museum's Acquisitions Policy which affirms the principle of respecting the natural and cultural heritages of all nations and communities, these acquisitions have been approved by the Thai Minister of Education and Director-General of the Fine Arts Department as a "token of cultural relations between Canada and Thailand," and so authorized by the Thai Act on Ancient Monuments, Objects of Art and National Museums. Gratitude is extended to those officials and to the Department of External Affairs, which negotiated the purchase through the Canadian Embassy in Bangkok. Special thanks are expressed to Mrs. George G.R. Harris for her generosity in providing the funds, and to Mr. and Mrs. Gordon E. Cox for their many good offices in liaison between the various government agencies involved.

These finely painted pottery vessels and bronze ornaments came from a vast necropolis and a stratum for which thermoluminescent testing has given a date of 3590 ± 275 B.C. Since discovery of the burial ground in the 1960s, the modern village at Ban Chiang has been inundated by despoilers. However, controlled excavations are continuing under the direction of the Thai Department of Fine Arts, and important information about the Bronze Age in Southeast Asia is increasing steadily.

H.Y.S.

Guatemalan woman's bodice (huipil), brocaded and embroidered cotton trimmed with commercial rick-rack. Village of Santos Todas, about 1950.

Since 1971 the Royal Ontario Museum has been building a collection of Central American regional costume and textiles. In recent months the Ethnology and Textile departments cooperated in purchasing a collection of costumes from several villages in the Guatemalan highlands and from Chiapas State in southern Mexico. Some of these are included in the current show, "Costume of the Andes", in the second floor galleries until December 31.

J.V.

Recent Publications

Annotated Checklist of the Birds of Ontario, ROM Life Sciences Miscellaneous Publication, *R.D. James, P.L. McLaren, and J.C. Barlow,* pp. iv + 76, $2.50 paper
This inclusive, up-to-date checklist records the occurrence of the 394 living species of birds in the province and includes data on another 34 species of hypothetical occurrence. Each concise species account includes summary information on breeding, common name, scientific name and authority, frequency of occurrence, abundance, seasonal occurrence and distribution, migratory status, dates of occurrence in the province, earliest and latest egg dates, and the subspecies found in the province. An essential handbook for ornithologists and birdwatchers.

Athlon: Essays on Palaeontology in Honour of Loris Shano Russell, ROM Life Sciences Miscellaneous Publication, *edited by C.S. Churcher,* pp. 286, $15.00 hardcover
This collection of papers, published in honour of Loris Russell, Curator Emeritus, contains eighteen contributions on subjects as diverse as Pleistocene mammals and jawless fishes. Other contributions describe new species of ostracoderms, amphibians, hypsilophodont dinosaurs, rhinocerotoids, and squirrels. The contributors include many of North America's leading palaeontologists.

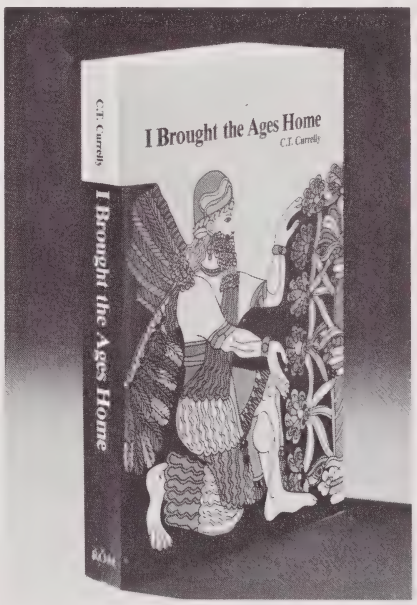
Gold for the Gods, *edited by R.D. Tushingham,* ROM, pp. 146, ill. b. & w. and colour, $3.50 paper
Published to accompany the ROM's major exhibition of Inca and pre-Inca artifacts from Peru, this splendid catalogue illustrates many of the exhibition's most important pieces, and includes comprehensive essays on the geography of Peru and on the culture, technology, and history of its ancient peoples. It is a permanent reference to one of the world's richest periods of civilization.

I Brought the Ages Home, *C.T. Currelly,* reprinted by the ROM, pp. 312, ill. b. & w., $4.95 paper
C.T. Currelly, the first director of the Royal Ontario Museum of Archaeology, was also its greatest collector. As a young man he set out to the lands of the Bible and the Pharaohs, risking great danger to rescue the ancient treasures that became the foundation of the Museum's great archaeological collections. This is his own story of his adventures in the deserts and cities of the Middle East in the early years of this century, and of how he later sought and acquired for the new Museum priceless artifacts from all corners of the earth. A fascinating autobiography of a remarkable Canadian, now in print again.

Northwest Coast Gallery, *Ethnology Department,* ROM, pp. 24, ill. b. & w., $1.00
A heavily illustrated guide of the Northwest Coast Gallery that also serves as an introduction to the traditions, technology, culture, and religion of the Indian peoples of the Northwest Coast.

ROM Gallery Guides, *Members' Committee,* ROM, each 4–12 pp., ill. b. & w., $.15–$.25, binder $1.00, complete set with binder $2.95
Brief guides to eleven of the Museum's galleries, including the Carling Gallery of World Reptiles, the Gallery of Arthropods, the English Galleries, the Egyptian Galleries, the Far Eastern Galleries, the Textile Galleries, the Geology Galleries, Mammals in the Animal Galleries, the Gallery of Canadian Fishes, the Mineralogy Galleries, and Birds in the Animal Galleries. They are available separately or in an attractive binder that will accommodate forthcoming Gallery Guides.

Roman Pottery in the Royal Ontario Museum, *John W. Hayes,* ROM, pp. 125, ill. b. & w., $13.50
This comprehensive catalogue is devoted to the Royal Ontario Museum's collections of Roman and Early Christian pottery, covering the period from the first century B.C. until about the seventh century A.D., from the Mediterranean regions of the Roman Empire. The catalogue is a much-needed tool for scholars of Mediterranean antiquity. John W. Hayes, Associate Curator of the Greek and Roman Department, is an internationally recognized authority on Roman and pre-Roman pottery.



You rise in perfection on the horizon of the sky,
O living Aten, who started life.
When you have risen upon the eastern horizon
you fill every land with your perfection.
You are appealing, great, radiant, high over every land;
your rays join the lands to the extent of all you have made.
Since you are Re, you reach as far as they do
and you curb them for your beloved son.
Though you are far away, your rays are upon the land,
you are in their faces, yet your departure is not observed.
When you set on the western horizon
the land is in darkness after the fashion of death.

A Pharaoh's Temple to the Sun

Archaeologists Unearth the Remains of the Cult that Failed

Allyn Kelley

Right: This colossus of Akhenaten which once graced the Temple of the Aten at Karnak shows the distinctive and bizarre artistic style in favour during the Amarna period.

Opposite page: The East Karnak site is sectioned into a series of 12-metre trenches that are carefully excavated. A record is made of any change in soil colour, texture, or composition. The workers are standing just above the first indication of the "Persian-Ptolemaic" village, having removed nearly three metres of debris and overburden.

Few Pharaohs of ancient Egypt have excited such curiosity, admiration, and controversy as this "beloved son" of the Hymn to the Aten, Akhenaten (c. 1369–1352 B.C.). During the brief span of seventeen years this 18th dynasty ruler attempted to obliterate the power and monuments of Egypt's host of gods and minor cults and substitute in their place the devotion to a sole deity, the Aten, personified in the heavens by the disc of the sun and represented on earth by himself, the chief priest and disciple of this new monotheistic faith.

Prominent among the adherents to these ancient beliefs which Akhenaten sought to expunge were the priests and cult officials of Amun-Re, who suffered grievously from the piety and fervour of the Aten's worshippers. Temple inscriptions were defaced, monuments neglected, and relief scenes of Amun's priests ruthlessly hacked from tombs in the cemeteries in western Thebes and elsewhere in Egypt. Even the mighty temple of Karnak, the central shrine of Amun, was abused and damaged by the fanatics of the true faith. In place of these deities arose the cult of the Aten, the one god, with Akhenaten as the prophet and sole intermediary for the god's dealings with mortal men.

Akhenaten's faith did not long survive his own premature death, and the vengeance of the resurgent supporters of Amun has reduced to dust most of the traces of this heretical faith wherever it rose from the Egyptian soil. The capital at Tell el-Amarna in middle Egypt was reduced to rubble and the buildings of the Aten at Karnak dismantled and used as building materials for the second, ninth, and tenth pylons and the columns in the great hypostyle hall of the temple of Amun-Re. But despite this vicious and generally successful effort to efface the memory of Akhenaten and his god, the beauty and fervour of this early attempt at monotheism have been preserved for us in such texts as the Hymn to Aten (later reflected in Psalm 104), in a radical and sometimes bizarre art style, and in the fragmentary remains of Akhenaten's building projects.

Opposite page, top: The pickmen and basketboys in each trench are supervised by an experienced qufti, from the town of Quft. The village has supplied experienced workmen for archaeological campaigns since the time of Sir W.M.F. Petrie early in this century.

Opposite page, lower: Mahmoud, a worker at the site, carefully brushes away the soil to expose a mud-brick wall. The pace is slow so that no object will be missed as the soil is removed.

Below: Akhenaten is shown making an offering to the Aten. Stylized sun rays ending in hands descend from the disc. Many fragments of blocks similar to this have been found by the East Karnak expedition.

For many years, Egyptologists and archaeologists have been attempting to reconstruct the history and setting of the Amarna age from the scattered stones and bits of debris found in the soils of Egypt. In the early decades of this century German and British archaeologists laid bare the remnants of the capital of Akhenaten at el-Amarna and provided us with a nearly complete picture of a New Kingdom Egyptian town. More recently, scholars have been struggling to piece together the myriad of *talatat* or stone blocks found at Thebes, the capital of Egypt prior to Akhenaten's move to el-Amarna. Over 30,000 of these blocks decorated in relief have been recovered in Thebes, where they were used as the foundations and supporting rubble for later temples and religious edifices.

The reconstruction of this mammoth jigsaw puzzle has been the task of the Akhenaten Temple Project of the University Museum of the University of Pennsylvania and is now under the direction of Professor Donald B. Redford of the Department of Near Eastern Studies of the University of Toronto. In April, 1975 the search for Akhenaten's remains took on a new aspect with the inauguration of excavations east of the temple of Karnak in Thebes. This large expanse of dirt and rock-covered hills lies trapped between the eastern enclosure wall at Karnak and the sleepy, sun-soaked village of Naga el-Fugani. Once it was the centre of the Aten's worship in Thebes, a scene of splendid pageants and ritual, but today it subsists as a home for grazing goats and lies exposed to the fierce summer winds and heat.

This image is now rapidly changing as a team of archaeologists, students, and local labourers under the direction of Prof. Redford bore through the tons of dirt and broken stones in search of the temples of the Aten. In the mid-twenties, a young inspector at Karnak, Henri Chevrier, found in this area the

Above: The site of Akhenaten's temple is bordered on the east by the village of Naga el-Fugani. A picturesque community of mud-brick houses shaded by groves of palm trees, it supplies the majority of pickmen and basketboys for the East Karnak expedition.

Right: Prior to excavation, the East Karnak site was an area of mounds of soil and stones, with sparse patches of camel-thorn bushes. To the west is the Nectanebo gate in the eastern enclosure wall of the Temple of Karnak.

Opposite page: The central passage through the great hypostyle hall of the Temple of Amun at Karnak illustrates the monumental scale of the Egyptian builders. The columns of the hall were started by Sety I and completed by his son Rameses the Great; some with material from the dismantled temples of Akhenaten.

One of the most important records of a site is the preparation of a section drawing that shows the extent, thickness, and nature of overlying soil levels. Here, Dr. Redford measures successive layers in order to draw the stratigraphy of the trench.

famous colossi of Akhenaten which now grace the Louvre and the Cairo Museum. Extending Chevrier's cursory soundings to the north and south, the East Karnak expedition is now tracing the remains of at least one temple to the Aten and finding evidence of later village occupation in the bygone capital of Thebes. Four seasons have been completed, the most recent starting in April of this year, with funds supplied by the Killem Foundation of Canada, the Royal Ontario Museum, the Society for the Study of Egyptian Antiquities, and James Delmege of Fiuggi Fonte, Italy. Six trenches, some 12 metres square, have been excavated about 100 metres east of the Nectanebo gate at Karnak and the tiring task of removing the three metres of dump over a Ptolemaic-Persian village is nearing completion. The goals at this early stage are to ascertain the stratigraphy of the area neglected by Chevrier, to delineate the scope and form of the village community, and to discover

the extent and nature of the underlying Aten structures and identify their arrangement and function.

The East Karnak archaeological team is one of the very few expeditions braving the summer climate of upper Egypt, where temperatures in excess of 100 degrees Farenheit are the daily norm. Such staunch dedication stems largely from the need to adjust digging schedules to the demands of North American school terms, the early summer being the first opportunity to lay aside the duties and pressures of teaching and studies. Work on the site normally begins at 6 a.m. and continues in the field until the early afternoon, when the actual recording and supervision of the excavation are done. Later in the day work turns to the careful photographing, drawing, and cataloguing of the day's objects,accompanied by a variety of opinions as to their significance and importance.

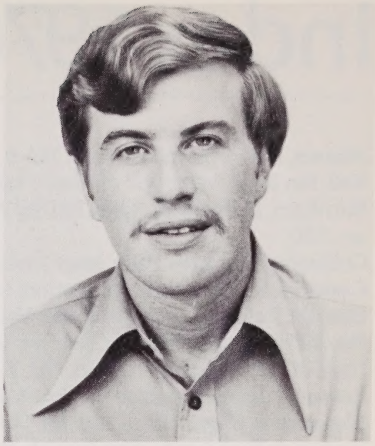
Occasionally several days will go by without noteworthy finds, only to be followed by a mad flurry of activity as objects of stone, pottery, and metal intermeshed with puzzling mud-brick structures appear beneath the workmen's tools. Even during removal of the overlying dump, a vast quantity of broken stone *talatat* finished with reliefs and often bearing traces of their original painted colours have been recovered. The harvest promises to become richer and more tantalizing in the season ahead.

To date the results have already justified the many months and countless hours of physical and mental toil. The original dump has been cleared over a wide area to reveal a number of broken reliefs and ceramic products. Second, the extent of what appears to be a Ptolemaic-Persian village has been mapped in six locations and reveals a series of at least three building phases. The full clearing of this village will give archaeologists one of the most complete and vivid examples of early Egyptian settlement planning and daily life. Third, we have found evidence in two areas for occupation during the 21st dynasty, primarily in the form of city debris and stamped fired bricks, all coming from the later occupation of the temple area after its destruction by the restorers of Egypt's earlier faiths.

Finally, and of great importance to the purpose of the East Karnak expedition, we have traced a portion of the temple *Gm-t (w) p3-Itn* (the sun-disc is in [the house of the sun-disc]) in one 12-metre square. Already it is clear that the temple was a large, open court probably several hundred metres on a side, surrounded by a roofed colonnade founded on square piers. In front of each pier was a standing statue of Akhenaten in the dress and manner of Osiris. The colossi of Akhenaten found by Chevrier are all that remain of these huge manifestations of Akhenaten's power and piety. The broken stone blocks or *talatat* from this temple depict the king's jubilee festival, an ancient Egyptian coronation pageant, celebrated at specific intervals and designed to reaffirm the Pharaoh's right and ability to exercise his role as the lord of upper and lower Egypt. The carvings do not appear to be as refined or as well executed as Akhenaten's later works at el-Amarna and the activities at Karnak appear to have been confined to the first five years of Akhenaten's reign. The scenes depicted represent the earliest stages in the artistic rendition of the Aten cult and often bear a close resemblance to the more traditional 18th-dynasty relief style of pre-Amarna Theban tombs.

Slight traces remain from an earlier use of the site prior to Akhenaten's construction campaign, including intact, whole pottery vessels and large numbers of broken bones. The recovery of this material is currently hindered, however, by its proximity to the water table, where mud and seeping waters are restricting the recording.

As the archaeologists eagerly await the onset of future campaigns, we can only hope that the continued sifting of the mounds of dirt will reveal even further the majesty of the early Amarna period at Thebes and allow us to sketch in yet another feature from this unique chapter of history on the banks of the Nile.



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Index 1976

Adams, Reg; *The Dust of Life;* Vol. 9, no. 2:30
Ball, Ian R.; *A Mere Box of Flies?;* Vol. 9, no. 2:12
Burnham, Dorothy K.; *Old Cuts for New Cotes;* Vol. 9, no. 3:30
Collecting Canada's Past; *Janet Holmes;* Vol. 9, no. 1:28
Cselenyi, L.; *The Devil's Invention;* Vol. 9, no. 1:4
Daniels, Peta; *A Legacy of Pride;* Vol. 9, no. 1:20
Devil's Invention, The; *L. Cselenyi;* Vol. 9, no. 1:4
Dust of Life, The; *Reg Adams;* Vol. 9, no. 2:30
Easson, Alison; *Elegance in Clay;* Vol. 9, no. 1:34
Elegance in Clay; *Alison Easson;* Vol. 9, no. 1:34
Emery, A.R.; *Sounds from the Silent World;* Vol. 9, no. 2:4
Focus; *Lisa Golombek;* Vol. 9, no. 1:2
Veronika Gervers; Vol. 9, no. 2:2
K. Corey Keeble; Vol. 9, no. 3:2
Chris McGowan; Vol. 9, no. 4:2
Furniture of Princely Splendour; *H. Hickl-Szabo;* Vol. 9, no. 3:14
Gervers, Veronika; *Focus;* Vol. 9, no. 2:2
Golombek, Lisa; *Focus;* Vol. 9, no. 1:2
Gold for the Gods; *A.D. Tushingham;* Vol. 9, no. 3:4
Growing Collections, The; Vol. 9, no. 1:26, no. 2:26, no. 3:21, no. 4:26
Hickl-Szabo, H.; *Furniture of Princely Splendour;* Vol. 9, no. 3:14
High on Victorian; *Peter Kaellgren;* Vol. 9, no. 1:14
Holmes, Janet; *Collecting Canada's Past;* Vol. 9, no. 1:28
Kaellgren, Peter; *High on Victorian;* Vol. 9, no. 1:14
Keeble, K. Corey; *Focus;* Vol. 9, no. 3:2
Kelley, Allyn; *A Pharaoh's Temple to the Sun;* Vol. 9, no. 4:32
King, Henry C.; *Omens of Disaster;* Vol. 9, no. 4:12
Legacy of Pride, A.; *Peta Daniels;* Vol. 9, no. 1:20
McGowan, Chris; *Focus;* Vol. 9, no. 4:2
McGowan, Chris; *The Search for the Loch Ness Phenomenon;* Vol. 9, no. 2:19
Mere Box of Flies?, A.; *Ian R. Ball;* Vol. 9, no. 2:12
Mining for Fossils; *Peter H. von Bitter;* Vol. 9, no. 3:24
Nagorsen, David; *Stalking the Brown Flower Bat;* Vol. 9, no. 4:4
Old Cuts for New Cotes; *Dorothy K. Burnham;* Vol. 9, no. 3:30
Omens of Disaster; *Henry C. King;* Vol. 9, no. 4:12
Pharaoh's Temple to the Sun, A.; *Allyn Kelley;* Vol. 9, no. 4:32
Prehistoric Man in Ontario; *Peter Storck;* Vol. 9, no. 4:20
Recent Publications; Vol. 9, no. 2:36, no. 4:31
Search for the Loch Ness Phenomenon, The; *Chris McGowan;* Vol. 9, no. 2:19
Stalking the Brown Flower Bat; *David Nagorsen;* Vol. 9, no. 4:4
Storck, Peter; *Prehistoric Man in Ontario;* Vol. 9, no. 4:20
Sounds from the Silent World; *A.R. Emery;* Vol. 9, no. 2:4
Tushingham, A.D.; *Gold for the Gods;* Vol. 9, no. 3:4
von Bitter, Peter H.; *Mining for Fossils;* Vol. 9, no. 3:24

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